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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/756,686	01/09/2001	Kazuo Matsuzaki	FUJI:179	4650

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EXAMINER

LOKE, STEVEN HO YIN

ART UNIT PAPER NUMBER

2811

DATE MAILED: 09/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/756,686

Applicant(s)

MATSUZAKI ET AL.

Examiner

Steven Loke

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 4-6, 8, 10, 12 and 14 is/are allowed.
- 6) ☒ Claim(s) 1-3, 7, 9, 11 and 13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 22 May 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3, 7, 9 and 11 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Funaki.

In regards to claim 1, Funaki shows all the elements of the claimed invention in fig. 9. It is a semiconductor device exhibiting a high breakdown voltage, comprising: a first region [4] of a first conductivity type (n-type); a second region [21] of a second conductivity type (p-type) formed selectively in the surface portion of the first region; a third region [23] of the first conductivity type formed selectively in the surface portion of the first region, the second region [21] and the third region [23] being spaced apart from each other; a fourth region [22] of the first conductivity type formed selectively in the surface portion of the second region; an offset region [7] of the second conductivity type formed selectively in the surface portion of the first region [4] between the second region [21] and the third region [23]; a first insulation film [11] on the offset region; a gate electrode [25] above the extended portion of the second region [21] extending between the fourth region [22] and the first region [4] with a gate insulation film [24] interposed between the extended portion of the second region [21] and the gate

electrode [25]; a first main electrode [26] on the fourth region [22]; and a second main electrode [27] on the third region [23].

Since the offset region [7] is formed by diffusion (col. 4, line 65, col. 6, lines 58-61), it is inherent that the offset region [7] comprises a plurality of sub-regions having different impurity concentrations aligned between the second region [21] and the third region [23] because the offset region [7] is made by a plurality of horizontal sub-regions each having a different impurity concentration from the other.

It is also inherent that the offset region [7] becomes a depletion layer when the device is turned OFF because there is always a depletion region formed in the area adjacent to the pn junction between the p-type offset region [7] and the n-type region [4].

In regards to claim 2, Funaki further discloses the depths of the sub-regions of the offset region [7] are different from each other.

In regards to claim 3, Funaki further discloses the gate electrode [25] is extended onto the first insulation film [11].

In regards to claim 7, Funaki inherently discloses the impurity concentration of the sub-region on the side of the second region [21] (the middle portion of region [7] near region [21]) is higher than the impurity concentration of the sub-region on the side of the third region [23] (the bottom portion of region [7] near region [23]) because region [7] is formed by diffusion.

In regards to claim 9, Funaki further discloses the diffusion depth of the sub-region on the side of the second region [21] is deeper than the diffusion depth of the sub-region on the side of the third region [23].

In regards to claim 11, Funaki further discloses the impurity concentration of the sub-region is the concentration of an impurity of the second conductivity type (p-type).

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Funaki.

In regards to claim 13, Funaki differ from the claimed invention by not showing the surface impurity concentration of the offset region of the second conductivity type is changed by adding an impurity of the first conductivity type, the amount thereof being less than the amount of the impurity of the second conductivity type in the offset region.

It would have been obvious for the surface impurity concentration of the offset region of the second conductivity type is changed by adding an impurity of the first conductivity type and the amount thereof being less than the amount of the impurity of the second conductivity type in the offset region because it is a well known method to reduce the impurity concentration of the second conductivity type.

The process limitation of how the offset region is formed has no patentable weight in claim drawn to structure. It is important to note that there are many ways to make the offset region of the second conductivity type. Therefore, the phrase "the surface

impurity concentration of the offset region of the second conductivity type is changed by adding an impurity of the first conductivity type, the amount thereof being less than the amount of the impurity of the second conductivity type in the offset region" is thus non-limiting.

5. Claims 4-6, 8, 10, 12 and 14 are allowed.

6. The following is a statement of reasons for the indication of allowable subject matter: The major difference in the claims not found in the prior art of record is a semiconductor device comprising an offset region of a second conductivity type formed in a first region of a first conductivity type which formed in a semiconductor substrate of the second conductivity type. In addition, the offset region becomes a depletion layer when the device is turned OFF.

7. Applicant's arguments with respect to claims 1-3, 7, 9, 11 and 13 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven Loke whose telephone number is (703) 308-4920. The examiner can normally be reached on 7:50 am to 5:20 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

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September 7, 2003

Steven Loke
Primary Examiner

A handwritten signature in cursive script that reads "Steven Loke".